Syllabi for B.Tech Electronics and Communication Engineering
(5th to 8th Semester)

Course Title	Entrepreneurship and Management Functions	Course No	To be filled by the office		
Specialization	HMC	Structure (IPC)	3	0	3
Offered for	B. Tech.	Status (Core / Elective)	Core		
Prerequisite		To take effect from			
Course Objectives	The objective of this course is to provide engineering students an exposure to the basic concepts of entrepreneurship and management, with a specific focus on the process of turning an idea into a commercially viable venture.				
Course Outcomes	At the end of the course, the students will learn how to Understand the market & competition Prepare a business case for the product/idea				
Contents of the course	Module 1: Introduction · Division of labor and creation of value · Evolution of organizations, industries and sectors, for profit and non-profit · Role of Entrepreneurs and Managers in value creation · Principles of Management - Planning, Organizing, Resourcing, Directing (4) Module 2: Strategy & Planning · Understanding industry dynamics & competition (Porter's Framework) · Understanding the industry value chain and firm positioning (6) Module 3: Organizing · Typical organizational functions (R&D, Marketing & Sales, HR, Operations) · Cybernetics of organizational functions (Stafford Beer's viable systems model) · Types of organization structures (product, functional, matrix, global) (6) Module 4: Resource Management · Financial management (Sources of funding, how to read a P&L, balance sheet) · Human resource management (Interviewing, compensation, motivation) · Global sourcing and supply chain management (8) Module 5: Management Information & Decision Making (4) Module 6: Legal and Regulatory environment (4)				
Textbook	1. Peter F Drucker, *The Practice of Management*, Harper Collins, 2006, ISBN: 978-0060878979 2. Hentry Mintzberg, *Managing*, Berret-Koehler Publishers, 2009, ISBN: 978-1605098746 3. Michael Porter, *On competition: Updated and Expanded Edition*, HBS, 2008, ISBN: 978-1422126967 4. Vasanta Desai, *Dynamics of Entrepreneurial Development and Management*, Himalaya Publishing House, ISBN:9788183184113.				
References	1. Walter Isaacson, *Steve Jobs*, 2011, ISBN:978-1451648539 2. Eric Ries, *The Lean Startup*, Portfolio Penguin, 2011, ISBN: 978-0307887894 3. Vineet Bajpai, Build from scratch, Jaico books, 2013, ISBN: 9788184952919.				

Course Title	Analog Communication	Course No	To be filled by the office

Specialization	Electronics Engineering	Structure (IPC)	3	0	3
Offered for	B. Tech.	Status (Core / Elective)	Core		
Prerequisite	Signals and Systems	To take effect from			
Course Objectives	The primary goal of this course is to introduce the basic principles that are used in the analysis and design of communication systems. This course is fundamental to other advanced communication courses like Wireless Communications, Optical Fiber Communication, and many others.				
Course Outcomes	At the end of the course, the students are expected to 1 Analyse different analog modulation schemes 2 Evaluate the performance of various communication systems 3. Analyse the power and bandwidth considerations, analyze the spectral efficiency of various modulation schemes, and link budget analysis.				
Contents of the course	Review of Signals and Systems: Representation of signals and systems in a communication system, continuous and discrete time signals, Fourier series and Transform – review (6) Lowpass and bandpass signals and channels, concept of complex envelope, Hilbert transform and phase shifting (4) Continuous wave (CW) modulation: AM, DSB/SC, SSB, VSB, methods of generation; Demodulation techniques of CW modulation: coherent and non-coherent (6) Nonlinear modulation techniques: FM and PM, narrowband FM, wideband FM, methods of generation; FM spectrum (3) Demodulation techniques for FM; Frequency Division Multiplexing (FDM) (2) Sampling a signal by periodic pulse stream: spectra of ideally sampled signal, Nyquist sampling theorem, flat-top sampling, sampling of bandpass signals, examples of sampling circuits; PAM, PWM, PPM, PFM (6) Performance of analog modulation schemes in AWGN : SNR, post-demodulation SNR and figure of merit for AM, DSB/SC, SSB, FM, threshold effect in FM, pre-emphasis and de-emphasis in FM, FMFB.(10) Noise in receivers; Noise figures; Radio link design, radio transmitters and superheterodyne receivers (5)				
Textbook	1. B. P. Lathi and Z. Ding, “Modern Digital and Analog Communication Systems,” 4th Edition, Oxford University Press, 2011. 2. S. Haykin, “Communication Systems,” 4th Edition, Wiley, 2006.				
References	1. J. M. Wozencraft and I. M. Jacobs, “Principles of Communication Engineering,” Wiley, 1965.				

Course Title	Digital Communication	Course No	To be filled by the office		
Specialization	Electronics Engineering	Structure (IPC)	3	0	3
Offered for	B. Tech.	Status (Core / Elective)	Core		
Prerequisite	Signals and Systems	To take effect from			
Course Objectives	The primary goal of this course is to introduce the basic principles that are used in the analysis and design of communication systems. This course is fundamental to other advanced communication courses like Wireless Communications, Optical Fiber Communication, and many others.				
Course Outcomes	At the end of the course, the students are expected to 1. Describe and Analyze transmission of digital data using baseband and carrier modulation techniques 2. Analyze/Understand BER of various digital communication systems 3. Analyse the power and bandwidth considerations, and analyze the spectral efficiency of various modulation schemes 4. Analyze Signal Transmitted, noise process involved and compare receive structures				
Contents of the course	Review of Probability Theory, Random Processes (Stationarity (SSS,WSS), Power Spectral Density, Filtering a WSS Random Process, Sampling a CT Random Process), Review of Nyquist Sampling Theorem (10) Vector Channel, Gram-Schmidt Orthonormalisation, Conversion of waveform channel model to Vector model. Vector modelling of modulation schemes-BPSK, FSK, MPSK. MPAM, M-QAM, (4) MAP and ML Detection. Minimum Distance Detector, Decision Regions, Examples of Decision Regions, Probability of Error. Error Probability for Various Modulation Schemes (6) Equalization – Introduction, and different Equalizers (an overview) (6) Linear block codes: Parity-check matrix, Codeword Weight, Minimum Distance. Introduction to hard and soft ML decoding. Hard ML decoding for BSC, Syndrome Decoding for Linear codes, Error-correcting capability, Convolutional codes, State diagram for trellis. (16)				
Textbook	1. B. P. Lathi and Z. Ding, "Modern Digital and Analog Communication Systems," 4th Edition, Oxford University Press, 2011. 2. S. Haykin, "Digital Communication Systems," 1st Edition, Wiley, 2014 3. Upamanyu Madhow , " Fundamentals of Digital Communication", Cambridge Press, 2008				
References	1. J. M. Wozencraft and I. M. Jacobs, "Principles of Communication Engineering," Wiley, 1965. 2. J. R. Barry, E. A. Lee, and D. G. Messerschmitt, "Digital Communication," 3rd Edition, Springer, 2004.				

Course Title	Micro Processors and Computer Architecture	Course No			
Specialization	Electronics Engineering	Structure (IPC)	3	0	3
Offered for	B. Tech.	Status	Core ▬	Elective	
Pre-requisite		To take effect from			
Objectives	The goal of this course is to provide a good understanding of the components of a fast computing system, structure and functionalities of different architectures, and programming of microprocessors.				
Course Outcomes	The course would equip students to 1. Learn to develop suitable architectures for certain applications 2. Use microprocessors for building real time systems				
Contents of the course	Evolution and Performance of Processors**:** (2) Computer System: Computer Components and Interconnections; Memory and I/O Organization: Cache, Internal, External, Input/Output, and Operating System (5) Processor Architecture and Functions: RISCs versus CISC, Register File, General Instruction Types, Addressing Modes (10) Memory Accesses, Pipelining, ALU and Arithmetic Instruction Format for Intel x86 and ARM processors (10) Control Unit: Hardwired Implementation and Microprogrammed Control (5) Instruction-Level Parallelism: Design Issues, Machine Parallelism, Branch prediction, Superscalar Execution (5) Parallel Processing: Use of Multiple Processors, Multithreading, Vector Computation (5)				
Textbook	1. W. Stallings, Computer Organization and Architecture, Eighth Edition, Pearson Education, 2010				
References	1. D. A. Patterson and J.L. Hennessy, Computer Organization and Design – ARM Edition, Morgan Kaufmann, 2010 2. INSIDE THE MACHINE: An Illustrated Introduction to Microprocessors and Computer Architecture, Jon Stokes, 2007, ISBN-13: 978-1-59327-104-6, No Starch Press, Inc. 3. Intel Microprocessors by Barry B. Brey, Prentice Hall; 8 edition, 2008 4. S. Furber, ARM System-on-chip Architecture, Pearson, Thirteenth Impression, 2012				

Course Title	Power Electronics	Course No			
Specialization	Electronics Engineering	Structure (IPC)	3	0	3
Offered for	B. Tech.	Status	Core ▬	Elective	
Pre-requisite		To take effect from			
Objectives	To introduce students to the basic theory of power semiconductor devices and passive components, their practical application in power electronics. 2. To familiarize the operation principle of AC-DC, DC-DC, DC-AC conversion circuits and their applications. 3. To provide the basis for further study of power electronics circuits and systems				
Course Outcomes	At the end of the course, a student will be able to: 1. Understand basic operation of various power semiconductor devices and passive components. 2. Understand the basic principle of switching circuits. 3. Analyze and design AC/DC rectifier, DC/DC converter and DC/AC inverter circuits. 4. Understand the role power electronics play in the improvement of energy usage, efficiency and the development of renewable energy technologies.				
Contents of the course	Introduction to power electronics; applications and role of power electronics. (2) Introduction to power semiconductor devices, operating characteristics of Power Diode, SCR, Power BJT, Power MOSFET and IGBT; Driver circuits and Snubber circuits. (8) Introduction to AC/DC rectifiers, principle of operation of phase controlled rectifiers, single phase and three phaseAC-DC line commutated converters, dual converter, and introduction to unity power factor converters. Applications: DC motor drives and Battery chargers. (9) Introduction to DC/DC converters, Principle of operation of DC/DC (Buck, Boost, Buck-Boost, Cuk, Fly-back and Forward) converters. Applications: Power supply, DC motor drives and SMPS. (11) Introduction to DC/AC inverters, PWM techniques, Principle of operation of single phase and three phase DC-AC inverters, Applications: AC motor drives, UPS, active filters, CFL, renewable power generation, induction and dielectric heating. (12)				
Textbook	1. N. Mohan, T. Undeland, and W. Robbins, "Power Electronics: Converters, Applications, and Design," 3rd Edition, Wiley, 2003. 2. M. Rashid, "Power Electronics: Circuits, Devices & Applications," Prentice-Hall, 3 rd Edition, 2003. 3. J. P. Agrawal, "Power Electronic Systems: Theory and Design," Pearson, 2013.				
References	1. Batarseh, "Power Electronic Circuits," John Wiley, 2004. 2. R. W. Erickson and D. Maksimovic , "Fundamentals of Power Electronics," 2 nd Edition, Springer, 2001. 2. R. W. Erickson and D. Maksimovic , "Fundamentals of Power Electronics," 2 nd Edition, Springer, 2001.				

Course Title	Sensing Instrumentation Practice	Course No	To be filled by the office		
Specialization	Electronics Engineering	Structure (IPC)	1	3	3
Offered for	B.Tech.	Status (Core / Elective)	Core		
Prerequisite	------	To take effect from			
Course Objectives	To familiarize the students with different sensors and their signal conditioning circuits required for different applications.				
Course Outcomes	By the end of the course, the students would be able to build systems which would sense the different physical signals and also process the signals in the required analog or digital formats.				
Contents of the course	Transducers, transducer sensing and functions, Passive and active – Resistance, inductance and capacitance, Strain Gauges, Hall Effect sensors, Optical sensors Measurement of non electrical quantities such as displacement/velocity/acceleration, pressure, force, flow and temperature, calibration of sensors, Data acquisition and detection techniques, Signal conversion, PC-based Instrumentation Systems Practice includes experiments from following topics: Signal generation – Instrumentation amplifiers – Signal conversion and processing – Characteristics of Transducers - Calibration of sensors – Measurement of physical quantities				
Textbook	1. Alan S. Morris, Measurement and Instrumentation Principles, Elsevier, 2001. 2. Sawhney. A. K, Course In Electrical & Electronics Measurement & Instrumentation, DhanpatRai, 2007.				
References	1. Bruce Mihura, LabVIEW for Data Acquisition (National Instruments Virtual Instrumentation Series), Prentice Hall, 2001. 2. Howard Austerlitz, Data acquisition techniques using PCs, Academic Press, 2nd Ed. 2002.				

Course Title	Micro Processors and Micro Controllers Practice	Course No			
Specialization	Electronics Engineering	Structure (IPC)	0	3	2
Offered for	B. Tech.	Status	Core ▬	Elective	
Pre-requisite		To take effect from			
Objectives	The goal of this course is to help the students have thorough understanding with the programming and usage of microprocessor and microcontrollers so as to build simple systems.				
Course Outcomes	The course would equip students to 1. Programme and use microprocessor 8086 and ARM processors for real time applications				
Contents of the course	Programming with 8086 and ARM processors Interfacing examples with 8086 and ARM				
Text	1. Kenneth J. Ayala, "The 8086 Microprocessor: Programming and Interfacing The PC", Delmar Publishers, 2007.				
References	1. A K Ray, K M Bhurchandi, Advanced Microprocessors and Peripherals, TMH, 2007. 2. A.N. Sloss, D. Symes and C. Wright, ARM System Developer's Guide, Morgan Kaufmann, 2004				

Course Title	Communication Systems Practice	Course No	To be filled by the office		
Specialization	Electronics Engineering	Structure (IPC)	0	3	2
Offered for	B.Tech.	Status (Core / Elective)	Core		
Prerequisite	------	To take effect from			
Course Objectives	The primary goal of this course is to have a hands on experience with the analog and communication systems. This course is fundamental to other advanced communication courses like Coding Theory, Wireless Communications, and many others.				
Course Outcomes	At the end of the course, the students are expected to 1 Analyse different analog modulation schemes 2 Evaluate the performance of various communication systems 3 Describe and analyse transmission of digital data using baseband and carrier modulation techniques 4 Analyze/Understand BER of various digital communication systems 5 Analyse the power and bandwidth considerations, and analyze the spectral efficiency of various modulation schemes				
Contents of the course	Amplitude Modulation: AM, DSB, DSB-SC, SSB, Frequency Modulation, Phase Modulation, Carrier recovery, PCM. BPSK, QPSK, PAM, MPSK, MQAM, FSK, modulation and demodulation/detection. PSD computation				
Textbook	1. B. P. Lathi and Z. Ding, "Modern Digital and Analog Communication Systems," 4th Edition, Oxford University Press, 2011. 2. S. Haykin, "Communication Systems," 4th Edition, Wiley, 2006.				
References	1. J. M. Wozencraft and I. M. Jacobs, "Principles of Communication Engineering," Wiley, 1965. 2. J. R. Barry, E. A. Lee, and D. G. Messerschmitt, "Digital Communication," 3rd Edition, Springer, 2004.				

<table>
<tr><td>Course Title</td><td>Design for Quality and Reliability</td><td>Course No</td><td colspan="3">To be filled by the office</td></tr>
<tr><td>Specialization</td><td>Design</td><td>Structure (IPC)</td><td>3</td><td>0</td><td>3</td></tr>
<tr><td>Offered for</td><td>B. Tech.</td><td>Status (Core / Elective)</td><td colspan="3">Core</td></tr>
<tr><td>Prerequisite</td><td>Measurements and Data Analysis Lab (Probability and Statistics)</td><td>To take effect from</td><td colspan="3"></td></tr>
<tr><td>Course Objectives</td><td colspan="5">The objectives of the course are to help engineering students understand:
(1) To understand concepts of quality & reliability

(2) To evaluate the overall reliability of a system from component reliability.</td></tr>
<tr><td>Course Outcomes</td><td colspan="5">Attending the course would enable the student to:

1. Model repairable and non-repairable systems and calculate failure rate, repair rate, reliability and availability
2. Use various probability density distributions significant to reliability calculations
3. Fit a given failure data set of a product into a Weibull distribution and estimate the reliability parameters.</td></tr>
<tr><td>Contents of the course</td><td colspan="5">Module 1: Concepts of Product Quality

• Quality Function Deployment / House of Quality
• Six Sigma (6)

Module 2: Concepts of Reliability

· Basic concepts of repairable and non-repairable systems
· Reliability, Availability and Maintainability (6)

Module 3: Failure data analysis

· Fitting discrete and continuous distributions to failure data sets, Weibull analysis, estimation of important reliability parameters (8)

Module 4: Calculation of System Reliability from Component reliabilities

· Markov modeling of repairable and non-repairable systems
· Reliability Logic Diagrams
· Fault-tree analysis (8)

Module 5: Preventive and Predictive maintenance

Failure Modes and Effects Analysis. (4)</td></tr>
<tr><td>Textbook</td><td colspan="5">1. Louis Cohen, Joseph P. Ficalora, Quality Function Deployment and Six Sigma: A QFD Handbook, Prentice Hall, Second Edition, 2009, ISBN: 9780137035441
2. VNA Naikan, Reliability Engineering and Life Testing, PHI Learning, 2010, ISBN: 978-8120335936
3. Singiresu S Rao, Reliability Engineering, Pearson Education, 2014, ISBN: 978-0136015727</td></tr>
<tr><td>References</td><td colspan="5">1. Patrick O Connor, Practical Reliability Engineering, John Wiley, Student ed., 2009, ISBN:9780470979815
2. 2. B.L. Hansen & P.M. Ghare, Quality Control and Applications, Prentice-Hall, 1997, ISBN: 9780137452255</td></tr>
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Course Title	VLSI Design	Course No			
Specialization	Electronics Engineering	Structure (IPC)	3	0	3
Offered for	B.Tech.	Status (Core / Elective)	Core		
Prerequisite	-----	To take effect from			
Course Objectives	The goal of this course is to provide a good understanding in the analysis and design of CMOS logic circuits. It gives the importance of physical design and also treats the essentials of high speed logic circuits. Also provides a system level perspective to the students in designing complex VLSI circuits.				
Course Outcomes	The course would equip students to 1. Design and analyze combinational and sequential circuits using CMOS logic 2. Design VLSI systems using hardware description language Verilog				
Contents of the course	Electrical Characteristics: of MOSFETs-I-V equations, RC model, modeling of small MOSFETs; Basic operation of CMOS inverter, detailed analysis of its noise margin, propagation delay, power dissipation, Basic Logic gates in CMOS, Complex Logic gates in CMOS, Transmission gate circuits. (8) Physical Design: Structure of CMOS Integrated Circuits, Fabrication of CMOS Integrated Circuits; Elements of Physical Design- Layout of Basic Structure, cell concepts, FET sizing and Unit cell, layout optimization and area estimation for combinational logic circuits (6) Designing High-Speed CMOS Logic Networks, gate delays, driving large capacitive loads, Logical effort, Advanced Logic Circuits-pseudo-NMOS, Tri-state, clocked, dynamic and dual rail logic. (6) Design of sequential logic circuits: Static and dynamic latches, registers, dynamic transmission gate, pipelining approach, NORA-CMOS pipelined structures, Schmitt trigger (6) Design of VLSI Systems: System Specifications Using Verilog HDL, VLSI System Components, Arithmetic Circuits in CMOS VLSI, Memories and Programmable Logic, System-Level Physical Design, VLSI Clocking and System Design, Reliability and Testing of VLSI Circuits. (16)				
Text books	1. Introduction To VLSI Circuits And Systems, John P. Uyemura, John,2009, Wiley & Sons 2. Verilog HDL, A guide to digital design and synthesis, Samir Palnitkar, 2010, PHI				
References	1. CMOS Digital Integrated Circuits Analysis, Sung-Mo (Steve) Kang, 2011, TMH 2. Introduction to VLSI Systems: A Logic, Circuit, and System Perspective, Ming Lo Bin, 2011, CRC Press, ISBN 9781439868591 3. Principles Of Cmos VLSI Design, Neil H.E, Weste, 2010, Pearson 4. CMOS Logic Circuit Design, John P Uyemura, 2009, Springer 5. Verilog for Digital Design, Frank Vahid, Roman Lysecky, Wiely, 2007 6. Digital VLSI Design with Verilog, A Textbook from Silicon Valley Polytechnic Institute, Williams, John Michael, 2014 Springer 7. Digital Design and Verilog HDL fundamentals, Joseph Cavanagh, 2007, CRC Press, ISBN 9781420074154				

Course Title	Data Communication Networks	Course No			
Specialization	Electronics Engineering	Structure (IPC)	3	0	3
Offered for	B.Tech.	Status (Core / Elective)	Core		
Prerequisite	-----	To take effect from			
Course Objectives	To introduce the basic terminology of networking. To study the various layers and their roles.				
Course Outcomes	The course would equip students to • understand a transmission of a data in a network • acquire knowledge of various layers.				
Contents of the course	Overview of Data Communication and Networking: Introduction; Data communications: components, data representation (ASCII,ISO etc.), direction of data flow (simplex, half duplex, full duplex); network criteria, physical structure (type of connection, topology), categories of network (LAN, MAN,WAN); Internet: brief history, Protocols and standards; Reference models: OSI reference model, TCP/IP reference model, their comparative study. (4) Physical Layer: Overview of data(analog & digital), signal(analog & digital), transmission (analog & digital) & transmission media (guided & unguided); Circuit switching: timedivision & space division switch, TDM bus; Telephone Network; ATM, B-ISDN. (8) Data link Layer: Types of errors, framing(character and bit stuffing), error detection & correction methods; Flow control; Protocols: Stop & wait ARQ, Go-Back- N ARQ, Selectiverepeat ARQ, HDLC. (6) Medium Access sub layer: Point to Point Protocol, LCP, NCP, Token Ring; Reservation, Polling, Multiple access protocols: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, CSMA/CA Traditional Ethernet, fast Ethernet (in brief). (6) Network layer: Internetworking & devices: Repeaters, Hubs, Bridges, Switches, Router, Gateway; Addressing: IP addressing, subnetting; Routing: techniques, static vs. dynamic routing, Unicast Routing Protocols: RIP, OSPF, BGP; Other Procols: ARP, IP, ICMP, IPV6. (8) Transport layer: Process to Process delivery; UDP; TCP; Congestion Control: Open Loop, Closed Loop choke packets; Quality of service: techniques to improve QoS: Leaky bucket algorithm, Token bucket algorithm. (4) Application Layer: Introduction to DNS, SMTP, SNMP, FTP, HTTP & WWW; Security: Cryptography (Public, Private Key based), Digital Signature, Firewalls. (6)				
Text books	1. B. A. Forouzan, Data Communications and Networking, 4th edition, TataMcGrawHill 2012, ISBN: 0072967757 2. A. S. Tanenbaum, Computer Networks, 4th edition, Pearson, 2013, ISBN: 978-0132126953				
References	**1.** W. Stallings, Data and Computer Communications, 5th edition, Pearson, 5th edition, 2013, ISBN: 978-0133506488.				

Course Title	VLSI Design Practice	Course No			
Specialization	Electronics Engineering	Structure (IPC)	0	3	2
Offered for	B.Tech.	Status (Core / Elective)	Core		
Prerequisite	-----	To take effect from			
Objectives	The goal of this course is to provide a good understanding in the analysis and design of CMOS logic circuits. Equips the students in physical design of circuits. Also aims to give programming expertise using Verilog.				
Course Outcomes	The course would equip students to 1. Design combinational and sequential circuits using CMOS logic and simulate them 2. Design VLSI systems using hardware description language Verilog				
Contents of the course	1. Simulation and analysis of combinational and sequential circuits with CMOS logic 2. Simple system building using Verilog 3. Complex systems also to be built using Verilog				
Text books	1. Introduction To VLSI Circuits And Systems, John P. Uyemura, John,2009, Wiley & Sons 2. Verilog HDL, A guide to digital design and synthesis, Samir Palnitkar, 2010, PHI				
References	1. CMOS Digital Integrated Circuits Analysis, Sung-Mo (Steve) Kang, 2011, TMH 2. Introduction to VLSI Systems: A Logic, Circuit, and System Perspective, Ming Lo Bin, 2011, CRC Press, ISBN 9781439868591 3. Principles Of Cmos VLSI Design, Neil H.E, Weste, 2010, Pearson 4. CMOS Logic Circuit Design, John P Uyemura, 2009, Springer 5. Verilog for Digital Design, Frank Vahid, Roman Lysecky, Wiely, 2007 6. Digital VLSI Design with Verilog, A Textbook from Silicon Valley Polytechnic Institute, Williams, John Michael, 2014 Springer **7.** Digital Design and Verilog HDL fundamentals, Joseph Cavanagh, 2007, CRC Press, ISBN 9781420074154				

Course Title	Embedded Systems Practice	Course No	To be filled by the office		
Specialization	Electronics Engineering	Structure (IPC)	1	3	3
Offered for	B.Tech.	Status (Core / Elective)	Core		
Prerequisite	-------	To take effect from			
Course Objectives	In this course fundamental practices in the context of embedded systems will be covered. Hands-on experiments will be performed involving TI ARM Cortex-M microcontroller LaunchPad IDE (and booster packs), rapid prototyping of embedded systems using open source microcontrollers (Arduino, Raspberry Pi, BeagleBone Black), wireless networked embedded systems using Arduino shields, and Internet of Things concepts such as smart automation.				
Course Outcomes	At the end of the course, a student will be able to, 1. Understand how embedded systems interfaces operate (GPIO, interrupts, ADC/DAC, etc.) using the ARM Cortex LaunchPad IDE and booster packs 2. Perform experiments in sound, video (gaming) and mobile robots, with LCD displays, stepper and DC motors and RC servos 3. Rapid prototype embedded systems using open source microcontrollers (such as Arduino, Raspberry Pi, BeagleBone Black, and Intel Edison/Galileo). 4. Build wireless networked embedded systems using Arduino shields and modules (e.g., GPS, GSM/GPRS, Bluetooth, RFID, and ZigBee). 5. Conduct experiments in Internet of Things (e.g., using Arduino Yun, Intel and Microsoft Developer Kits)				
Contents of the course	Experiments in GPIO, serial interfacing, interrupts, data acquisition with ADC, sound and video, DAC Experiments in control of RC servos, stepper motors, DC motors, and design of video games and mobile robots Data acquisition and real-time control with Arduino, Raspberry Pi, and BeagleBone Black microcontrollers, shields, and add-on boards Experiments in wireless networked systems, using shields and modules, for GPS, GSM/GPRS, ZibBee, Bluetooth, and RFID Experiments in IOT for smart automation, with Intel and Microsoft development kits				
Textbook	1. IIITDM Kurnool –Embedded Systems Practice Manual.				
References	1. Jonathan Valvano and Ramesh Yerraballi, 2014, “Embedded Systems – Shape the World” (ebook). 2. T. Igoe, 2007, “Making things talk”, O’Reilly Press.				

Course Title	Data Communication Networks Pratice	Course No	To be filled by the office		
Specialization	Electronics Engineering	Structure (IPC)	1	3	3
Offered for	B.Tech.	Status (Core / Elective)	Core		
Prerequisite	-------	To take effect from			
Course Objectives	To introduce the basic terminology of networking. To study the various layers and their roles.				
Course Outcomes	At the end of the course, a student will be able to, 1. understand a transmission of a data in a network 2. acquire knowledge of practical implementation of networking techniques				
Contents of the course	Socket Programming IPC (Message queue) NIC Installation & Configuration (Windows/Linux) Familiarization with Networking cables (CAT5, UTP) Connectors (RJ45, T-connector) Hubs, Switches TCP/UDP Socket Programming Multicast & Broadcast Sockets Implementation of a Prototype Multithreaded Server Implementation of Data Link Layer Flow Control Mechanism (Stop & Wait, Sliding Window) Data Link Layer Error Detection Mechanism (Cyclic Redundancy Check) Data Link Layer Error Control Mechanism (Selective Repeat, Go Back N)				
Textbook	1. B. A. Forouzan, Data Communications and Networking, 4th edition, TataMcGrawHill 2012, ISBN: 0072967757 2. A. S. Tanenbaum, Computer Networks, 4th edition, Pearson, 2013, ISBN: 978-0132126953				
References	**3.** W. Stallings, Data and Computer Communications, 5th edition, Pearson, 5th edition, 2013, ISBN: 978-0133506488.				